

# HOW TO HITCH HORSES

*for*

## CHEAPER FARM POWER



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# HOW TO HITCH HORSES

## For Cheaper Farm Power

### Greater Production Per Man

In older countries where land is usually of high value and labor is cheap, agricultural effort is directed towards getting the largest return per acre, without much regard to the man-power required to accomplish this. In Western Canada, where land is plentiful and relatively cheap and labor is costly, this condition is reversed, and success in grain raising lies in getting the largest production with the least expenditure for labor—in other words, production per man rather than per acre. While large production is desirable, that production must be attained at low cost. This calls for the use of power in large units for field work, permitting the working of a large acreage per day per man.

### The Most Efficient Farm Power

It is generally agreed by students of farm economics that the cheapest, the most efficient and the most flexible power for field work under conditions found in Western Canada is afforded by big teams of from five to twelve horses, pulling big equipment, and driven by one man.

While there is a tendency in some quarters to regard the tractor as the solution of the problem of cheaper farm production, on a closer study of the whole situation this view does not appear to be well founded, and fails to give due weight to several factors of major importance.

For instance, many farmers who have spent \$1000 to \$1500 for a tractor that will pull a 3-bottom plow, find that they still have to keep five or six horses to do other necessary work which it is not practicable or desirable to do with the tractor. They not only have to stand the interest, depreciation and expense on the tractor, but still have to keep almost enough horses to accomplish the same work without the tractor. The man who is farming with an 8-horse team under the modern system of control, has a power unit that will deliver as much power as the tractor, and in an emergency, very much more; that can be used regardless of weather conditions; and that can be divided up into a number of smaller units, suitable for any purpose about the farm. A tractor cannot be divided, but must be supplemented with a number of horses.

### More Timely Work

Then again, there is the question of timeliness.

It is not an uncommon experience of farmers dependent on gasoline power to be delayed in their field work at critical times because the ground is too soft, the tractor either digging itself in and having to be hauled out with horses, or packing the land; in some cases replanting weeds which had been turned up. With horses in large teams, the work can always be done at exactly the right time, even under conditions which would render it impossible with tractor power. This is real timeliness.

### Flexibility of Horse Power

And there is the factor of flexibility. Under favorable conditions, with light, loose soil, with plenty of moisture, a team of six good horses, or even five,

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might give plenty of power for a 3-bottom plow; whereas, in heavier land during a dry period, much more power might be required. It is an easy matter to add to the team any additional number of horses that may be necessary to furnish the power required. The power of the tractor cannot be reduced or augmented to suit any particular purpose.

### Most Economical Power

When it comes to a matter of cost there is no room for argument. Nothing tractor, oil, gasoline nor the many other items entering into cost of upkeep, can be produced on the farm, but manure heavy and continual drain on the revenues of the farm; whereas with horses both the power unit and the means of operation may be entirely the product of the farm, necessitating no cash expenditures. With wheat at war prices this was not so important; but with low-priced wheat this is an all-important factor, and might easily make the difference between success and failure.

### What Is a "Horse-Power?"

The nominal "horse-power" as the term is used in engineering, means a force of 33,000 "foot-pounds;" that is to say, a force that will raise 33,000 lbs. one foot in one minute or do an equivalent amount of work. The same force would raise 1,000 pounds 33 feet, or 25 pounds one thousand feet or any other combination of figures resulting in 33,000 foot-pounds.

It is a matter of general agreement that a horse in fair working condition, walking at a comfortable pace can be expected to sustain a draw-bar pull of about one-eighth of his own weight, ten hours a day, six days a week. On this basis a 1250 pound horse walking 3 miles an hour develops  $1\frac{1}{4}$  nominal horse-power, while a 1600 pound horse delivers  $1\frac{1}{4}$  nominal horse-power.

### Enormous Reserve Power

It will therefore be seen that a team of eight light farm horses will develop ten nominal horse-power—the draw-bar pull of a 10-20 tractor. But while a horse should not be asked to pull more than  $\frac{1}{8}$  of his weight as a regular thing, he can sustain a pull of half his weight or even more, for short periods. In an emergency, therefore, our team of eight 1250 pound horses can develop 40 or 50 nominal horse-power; and the same number of 1600-pound horses will deliver 12 horse-power as a steady thing, but can develop 50 or 60 horse-power for limited periods. A tractor, on the other hand, has little or no reserve power, and in an emergency where more power is wanted, such as pulling up a hill or going through a soft place, delivers less than its normal power, or possibly none at all.

### The Matter of Fertilizer

Another very important item which is seldom mentioned is the matter of manure. It is difficult to obtain data on the value of manure in Western Canada; but Bulletin No. 336 published by the Soils Department, Iowa State College, places the value of horse manure on Iowa soils at \$1.97 per ton as an average figure. Other authorities place the annual production of manure by a 1600 pound horse at over 10 tons. Assuming that half of this is lost, we have about \$10 as the value of the manure put back on the farm by each 1600 pound horse.

### Three Good Reasons

One successful large-scale farmer in the Edmonton district when asked by the writer why he used horses instead of tractor power put the matter concisely:

"There are a good many reasons," he said, "but three main ones. You see, tractors don't reproduce themselves; they don't eat anything that can be raised on the farm; and they don't yield any manure. When some genius arises to develop tractors without these defects, I will consider using them. In the meantime I consider that there is no room for argument for the man who is farming for profit."

### Raises Farm Prices

Many farmers do not seem to realize that horses are exclusively the product of the farm—of their own line of business—as the tractor is exclusively the product of the manufacturer. When a farmer buys tractor power he is encouraging the manufacture of something that is in direct competition with a product of the farm and is helping to lower the price of horses and all feed crops by cutting down the demand for their use. If all farmers would use horses in big teams instead of more expensive mechanical power, they would noticeably raise the value of all horses, adding many millions of dollars to the wealth of the farmers of Canada; and many farmers would find it profitable to raise colts to furnish horse-power to those preferring to raise other kinds of live stock.

The increased use of horses for farm power would inevitably raise the price of all feed crops by increasing the demand and reducing the surplus and would also raise the price of other live stock, as farmers who are raising more horses are presumably raising less live stock of other kinds.

It is not so much the amount produced, as the extent of the surplus or shortage of farm products, whether live stock or feed crops, that determines market prices. When any crop is say 10 per cent above normal requirements, prices drop 25 to 40 per cent; and whenever production is 10 per cent below normal requirements, prices advance 25 to 40 per cent. This happens every time, whether it is live stock or feed crops.

It is thus clear that the actual expense of horse-power on the farm, while less than that of any other form of power, may be very largely offset by better demand and higher prices brought about by the use of more horse-power.



Above are shown two teams pulling 2-bottom plows on the farm of Wm. Maxfield, in the Spruceville district, R.R. 4, Edmonton. The driver of the rear team of six horses is Miss Beatrice Maxfield, who handles them regularly during the rush season. The arrangement here shown is open to the criticism that under the modern system of hitching and control, these eleven horses could be put on a 4-bottom plow and handled easily by one driver with one pair of lines, thus reducing the cost of operation.

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## THE MULTIPLE HITCH

### The Modern System For Controlling Big Teams

To get the best results from the use of big horse teams it is of the utmost importance that the most approved system of hitching be adopted. This has come to be known as "The Multiple Hitch."

By this system horses in teams of any size from four to forty can be driven by one man with one pair of lines as easily as he can drive a pair of horses, with every horse in the team doing his full share of work and no horse overworking.

The multiple hitch system, or what is known as the tying-in and bucking-back method, is not an experiment as it has been successfully used for many years in the wheat fields of Washington and Oregon. As many as 23 horses are there commonly used in one team driven by one man, to pull the largest combines on the hilly wheat farms of that region, and has proved to be the most satisfactory form of power.



Eight-horse team pulling 14-bottom crowfoot cultivator on the farm of Lawrence Rye in Snohomish District, 16 miles north of Edmonds. Photo taken October 23, 1928. Mr. Rye farms 700 acres. His opinion of the respective merits of oats or gasoline as a source of power for field work is best indicated by the fact that he has on the farm a fine 25-35 tractor which he uses for plowing work only, using horses exclusively, for field work. Mr. Rye feeds his horses only while working them. During the Winter they run at the straw stacks; and during the slack period in summer they are in pasture.

The Multiple Hitch has now been extensively adopted in the Mississippi Valley, and its use is spreading to Western Canada. Farmers are finding that they can handle eight, ten or twelve horses in one team under a proper system of control, as easily as they can handle three or four in the old way and thus can accomplish two or three times as much per man per day. By the system of control embodied in the Multiple Hitch as explained in the pages following, a single pair of lines directly controls two or three horses; and these two or three automatically control all the others in the team. When these two or three control-horses stop or turn, all the others must do likewise or pull the load with their mouths.

Large teams controlled by the new multiple hitch system, with proper combining of farm implements, will double the usual output per man with horse-power, and will afford better than tractor accomplishment but without tractor expense. \*

## THE MATTER OF CONTROL

### Buck Straps and Tie Chains

The "tying-in and bucking-back" system of control is a very important factor in making a success with big teams.



**LEAD CHAINS.** The lead chain or tie-in chain is a  $\frac{3}{16}$  inch coil chain 6 feet long including a stout bolt snap at each end. One end is snapped into the halter ring of each rear horse and the other end to the trace chain of the horse diagonally ahead. (See figure 10-2). A horse as "tied-in" must follow the leader. If he is slow, the lead chain is shortened so that he must quicken his pace.



**BUCK STRAPS.** When these are properly adjusted they automatically drive each horse except the leaders, keep the horses in line with each other—if any of them have a tendency to walk up too far ahead; and will also make the horses walk straight ahead in the direction desired. They must be of strong material to control a wild or green horse when working for the first time.—(See figure 10-3).

**HOW TO PUT ON.** The forked ends of the buck strap are run through the hame rings and snapped into the bit with the longer section on the outside, or the side away from the draw chain. This longer check crosses over on the horse's withers. The long rear section of the buck strap is run back on the inside of the horse and snapped into the draw chain, somewhere between the heavy ring and the horse's hind legs, leaving very little slack in the entire buck strap, or just enough so the horse works comfortably with enough room to swing his head. If the horse is a slow walker, give him more slack and if he is a very fast walker he can be reined back a little tighter.

**HOW TO ADJUST.** When you start the team out, notice whether any of the horses show a tendency to walk to one side or the other. If so, simply snap the long rear section into the correct link of the short chain between the front checks. This shortens or lengthens the two front checks the desired amount, so the pressure on the bit will cause him to walk straight ahead. If the horse wants to head out, shorten inside check and if he crowds in, shorten outside check.

**OTHER REAR HORSES.** Any rear horse not next to the draw chain is reined back in exactly the same way by attaching the rear section of the buck strap to the heel chain of the horse that is next to the draw chain. (See Charts on Pages 10 and 14). In the case of a colt or green horse hitched in this position, it is good plan to connect the rear section of the buck strap to the ring or chain of the singletrees of the adjoining horse in place of the heel chain. This will give a more

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positively hold on the horse and absolutely prevent him from trying to jump ahead or stepping on the doubletrees ahead.

**WHY IT WORKS.** When the lead horses are stopped by the driver the draw chain falls to the ground and starts slipping back, which instantly starts drawing back on the bits of the rear horses attached to it, stopping them at the same time, and the instant these horses stop, the horses next to them are also stopped, because their reins are attached to the traces of these inside horses. They cannot pull the load with their bits. Where more than two-length teams are driven, each set of horses stops the ones behind them for the same reasons. It is thus impossible for any one of the rear horses to walk too fast, or do more than their share, or to do anything except stop when the leaders stop. Regardless of how many horses you have tied and reined in back of the leaders, they are driven and controlled more positively than the lead horses that you are handling with the lines, and it is even possible to use horses only partly broken in the rear position.

In unhitching, the buck strap is unclipped from the draw chain and snapped up into the harness, thus becoming a part of the harness. The tie chain is used as a halter shank, one end being put through the hole in the manger and snapped back at a point which will tie the horse at the desired distance.



Seven-horse team pulling 3-bottom plow on farm of Harold Jeffrey, R.R. 4, Edmonton. Photo taken October 23, 1928. There are 4 horses in the rear section of this team, one being hidden in the photo. This team would be more easily handled with the 4-horse section leading and driven by one pair of lines, all the other horses being controlled automatically by buck-straps and tie-chains.

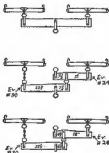
The season of 1928 has furnished a powerful argument in favor of horses as a source of field power. With No. 3 Northern worth less than a dollar a bushel at most Western elevators in December, and lower grades correspondingly less, the farmer who bought gasoline and oil all summer and had to meet a payment on his tractor in the fall, found himself in a very difficult position.

The man who hitched in more of his horses and got the power he needed entirely from the products of his own farm with no cash outlay, is in an enviable position, by comparison.

## EQUALIZATION

Another problem of driving horses in large units is that of equalization of draft so that no horse at any time has more than its share of the load to pull. On certain kinds of implements, such as the plow, side draft is also a factor that must be considered. The illustrations of 4, 5, 6, 8 and 12 horse hitches, contained in this bulletin, are of the Tullington type. Any man who is handy with tools may construct his own set. These hitches have been in use for many years in Western

North America in the more arid regions. There it has been necessary, because of the low precipitation and consequent low yields, to cut down production costs to an absolute minimum. The use of large horse units has helped to solve the problem. Much benefit may also be derived in many instances by the introduction of more efficient ways and means of hitching the units now in use.



14. Two lead teams in this 4-horse hitch form a 4-horse tandem hitch.

**FOUR AND SIX HORSE HITCHES.**—The four and six horse tandem hitches, (E abreast) as shown in Fig. 14, are designed for the plow, wagon with trailer, and binder. To hitch four horses abreast on a plow is not the best method, since it means either considerable side draft or that one of the horses must walk on the plowed land. To hitch tandem makes for much greater comfort for the horses and better plowing. The lead team is doing no more work, and where the owners are so constructed as to keep the angle of draft low, are expending no more energy to draw their share of the load than if hitched next to the implement. In adapting the hitch to the use of the wagon, it is fastened by means of a crotch chain to the front axle and operates underneath the pole. Thus the wagon pole will be of adequate length and the side whip will be taken off in going over rough ground. The equalizers on the rear horses of all the hitches shown in this bulletin draw at an angle, with the outside ends higher, adjusting themselves to the angle of the horses' shoulders. This adjusts the inside end of the equalizers at the point where the draw chain attaches from four to six inches lower than the point at which the hitch attaches to the implement, thus lowering the line of draft for the leaders, which is a great advantage in a tandem hitch.

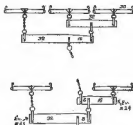
Figures 14, 15, 16, 17 and 18 show how five or six horses may be hitched by a system of buck straps and tie-in chains, so that they may be driven with one pair of reins. This system of control can easily be adapted to most tandem equalizers now in use. The equalizers shown are very efficient, inexpensive to make, and the five horse hitch is unique in that three horses are driven in front and two behind. The hitches are especially adapted to two furrow gang plows, but may be used to

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advantage on other machinery requiring five or six horses and adaptable to the hitch.

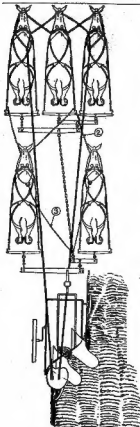
The five horse hitch has distinct advantages over either the abreast or ordinary tandem hitch. It is cooler and more comfortable for the horses than the common hitch, where three horses are driven behind and two in front. It provides the space



13. Five-horse equalizer in detail.

of nearly a whole horse between the two back horses, thus enabling the teamster to better see and control his leaders. The space allowed for the back horse on the left hand side provides an excellent place to drive an in-feed mare or a green colt. The five horse hitch shown in fig. 13 may be converted into a six horse equalizer as in fig. 12, with only a few alterations as indicated on the cuts. This provides for an extra horse as required in the heavier soil areas; when the weather is dry or as in plowing summerfallow.

**SEVEN TO TWELVE HORSE HITCHES.**—Figure 15 depicts what may be assembled into a seven, eight, or twelve horse hitch. These may be considered as of the larger type hitches, but are in use in many places. By the use of back straps and tie-in chains, any one of the units may be driven with one pair of reins. The eight horse unit may be used on machinery adapted to 10-20 tractor use. The 12 horse unit will draw 4 furrows in average to light soil and three furrows in the heaviest soils or in deep summerfallow. These hitches are especially adaptable to use on combines. Seven and eight horse units are now being driven in many parts of the West. A few are using a 12 horse unit, and many now driving eight are interested in a twelve. The illustration indicates clearly how the front 4 horse unit is an ordinary 4 horse equalizer, how the addition of the set immediately behind the leaders constitutes an eight horse equalizer and how, by the addition of the back four horse unit, the 12 horse equalizer is complete. By slight reorganization of the eight horse equalizer, a seven may be obtained. It will necessitate removing the eveners and singletrees of the left hand pair of the back four of the eight horse unit, substituting in its place a singletree and rebaring the back 43 inch eveners to the proportion of 34% to 6%, instead of 50 to 10.



15. Five-horse hitch in detail.

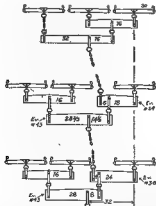
**NINE HORSE HITCH.**—The nine horse hitch in fig. 20 is designed for a three furrow gang plow when the load is too heavy for 8 horses. It is a cooler and more comfortable hitch for the horses than the 8 horse hitch with two 4 horse units hitched tandem. This hitch leads itself to attachment to the plow at a point in direct line of draft of the implement, thus eliminating all side draft.

**TEN HORSE HITCH.**—Figure 24 shows how 10 horses may be organized into one unit. It also shows details concerning the organization of hook ropes and tie-in chains, the principle of which remains the same for all units. It has been shown how horses may be hitched in units of 4, 6, 8, 7, 8, 9, 10 and 12 horses and driven by one man with one pair of lines. Anyone inclined to use an even larger unit may do so by adding 4 horse units to the back of the 12 in fig. 19. It is not difficult to construct additional eveners to accommodate the extra horses.

**APPLICATION.**—The hitches for 10 or more horses have perhaps but little application to the average Manitoba farm. A few large farmers may be in a position to use them as they are now being used in the semi-arid regions of Western North America, where land is being cultivated in large acreage units. The hitches dealing with units from 4 to 8 horses, however, are of immediate application to conditions that obtain on the average farm of Western Canada.

It requires somewhat more time to care for, hitch and unhitch 8 horse than 4. If, however, a man does twice as much work, an extra hour per day spent in looking after the larger unit will prove a profitable investment. In moving





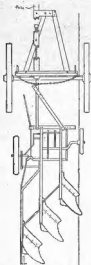
20. A good hitch for a 3-bottom plow or heavy cart. The same equation may be used for use in the 4-horse hitch.

the unit in and from the field unhitched from the implement, the lead team is driven in the regular manner, while the horses driven with back strap and the chain on the implement are fastened together and led. It will require minor re-adjustment and change from the old methods of handling horses in and out of the stable, to water, and to and from the field. Such changes are being made to suit the needs of the individual farmer and the result is a lowering of overhead production costs. Farming is a production enterprise, and, like any other business of its kind, any reorganization, be it ever so minor, that results in one man being able to produce more, or the power units to work more efficiently, makes for greater profits.

**USE OF MACHINERY.**—In the adoption of larger horse units it becomes a problem in some instances to provide machinery requiring the draft of so much power. It is not difficult to adjust tractor drawn implements to be used with horse-power.

Fig. 21 shows a drawing of a 3 bottom engine plow and home-made hitch cart. The back axle of a standard tread wagon is used with a front wheel of the wagon on the landside and back wheel on the furrow side of the axle. This is rather heavier than it requires to be, but is made of material found on every farm and used in many cases where a three or four bottom engine gang has been adapted to horse-power use. It will be seen that the line of draft of the plow is to one side of the centre of the cart, hence the pole is attached to the left of the centre, thus providing that one horse will walk on the land to the right of the pole and another in the furrow, with the other two of the back unit to the left of the pole.

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21. Home-made engine plow hitch cart.

Some farmers prefer to use only the axle and wheels, removing bolster and bounds. With this they use a 4 x 4 inch stick of sufficient length to reach back in line with the rear of the wheels for a pole. This stick is securely bolted and braced to the axle. Two shorter 4 x 4s are then bolted to the axle parallel to the 4 x 4, and one-inch boards are nailed crosswise, making a platform 4 feet square for the driver to ride on. It is advisable in big hitch work to have the driver's seat well up so he can see over the backs of his horses. In driving the larger units, clods or small stones are used to encourage some of the slow horses. An air rifle with the pressure reduced has also been found a very effective means of persuading the slow ones to keep up the pace.

Figure 25 shows how a tandem engine disc has been converted to the use of horse-power on the farm of the Manitoba Agricultural College. The pole and truck has been temporarily taken off a binder and serves the purpose very well.

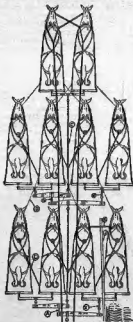
It is of the highest significance that the use of big horse teams for field power was originated, and the modern method of hitching developed, in the United States. If the progressive farmers on big farms of the North Western States find it economical to use horses, there can be no room for argument as to the desirability of this in Western Canada, where tractors and gasoline are much more costly than in U.S. and horses and horse-fed much cheaper.



22. Twelve horses driving a 4-bottom tractor plow by home-made hitch cart.



23. Six horses and 1 man working in a 9-unit outfit in Manitoba.



24. Showing "Tying-in and backing-back" system as constructed for 10-horse hitch. B—Tie-chain. D—Back-ring. X—Elastic link. C—Draw-chain. A—Ring connecting device.



23. Tandem engine *Sloc* converted into a horse-drawn implement at Manitoba Agricultural College. Easily handled by eight horses driven by one man.

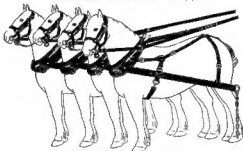


Twelve-horse team just before entering the stock parade at Brandon Summer Fair, 1927. This outfit was driven in the parade by one pair of lines by a farmer near Brandon.

It is all a matter of the hitch. Under the "tying-in bucking back" system of hitching first developed on the big farms in Montana, the use of which has been eagerly adopted by progressive farmers in many other states and in Western Canada, the entire team is kept under complete control by the lead team driven by a single pair of lines. So effective is this control that Colonel George C. Seaman, a large-scale farmer of Taylorville, Illinois, wrote after trying out the system:

"Of the eight horses in the hitch the first day we used them, five were Westerns, one of which had been hitched but twice, and another had been hitched but three times. The next day we put in another Western that had been hitched only once before. We find that these big hitchers are the ideal place to teach a young horse to pull and behave himself."

## GOLDEN GRAIN HARNESS



### No. 884 Multiple Hitch Field Harness

This harness has been specially designed for use with big teams. It embodies conclusions resulting from the combined experience of men who have been largely responsible for the development of the idea of field power from big teams of horses. Our Eight-Eighty line of field harness represents the last word in strength, simplicity, convenience and quick handling, and is without doubt the best Multiple Hitch Field Harness that has ever been devised. It is equally satisfactory for teams of any size, whether four horses or twenty. Though of great strength, it is light and easy to handle and requires very little time to put on or take off. Patent fasteners are used at the bottom of the harness, with snaps on the belly band and crupper. By a pull at the knee fastener and the hooking of two snaps the harness is fastened. In the field, too, this harness is a time-saver. The butt chains, being left attached to the single-tree, are quickly snapped into the dees of the traces, the line hand parts are snapped into the dees on the line fronts and away you go! One can readily see the advantage of a harness of this type where a large team is being used. Lead chains, Buck Straps, Lines with Fronts for either 2 or 4 horses, and Line Lengtheners, can be supplied with this harness, for use on teams of any number of horses; also Evensers, Draw Chains and complete equipment.

Any harness dealer in Alberta, Manitoba or Saskatchewan can supply this low priced but exceptionally efficient and serviceable field harness either in single units or in combinations for any number of horses.

**ACCEPT NO SUBSTITUTE. THERE IS NOTHING "JUST AS GOOD." BE SURE THAT EVERY PIECE IS STAMPED WITH OUR TRADE MARK "G.G." OR "HORSEINGO".**

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